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COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

VERBATIM RECORD OF THE 367th MEETING

Held at Headquarters, New York,
on Tuesday, 16 June 1992, at 10.30 a.m.

Chairman: Mr. HOHENFELLNER (Austria)

- Attendance by non-members of the Committee
- Statement by the Chairman
- Statement by the Chief of the Office for Outer Space Affairs
- General exchange of views

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The meeting was called to order at 10.50 a.m.

ATTENDANCE BY NON-MEMBERS OF THE COMMITTEE

The CHAIRMAN: I should like to inform members that I have received notes verbales from the Permanent Representatives of Greece, the Republic of Korea, the Libyan Arab Jamahiriya and Spain and from the Permanent Observer of the Holy See, in which they request permission to attend the current session of the Committee on the Peaceful Uses of Outer Space as observers. I should therefore like to suggest that in conformity with past practice we invite those delegations to attend the current session and to address the Committee as appropriate.

This is, of course, without prejudice to further requests of this nature and does not involve any decision by the Committee concerning status. It is a courtesy we customarily extend to delegations.

If there is no objection, we shall proceed accordingly.

It was so decided.

The CHAIRMAN: I call on the representative of Portugal on a point of order.

Ms. MENDES (Portugal): Speaking on behalf of the European Community and its member States, Portugal wishes to make the following statement and requests its inclusion in the official records of this session, recalling the text circulated in document A/46/905 dated 5 May 1992.

The European Community and its member States have taken note of the Declaration of 27 April 1992 of the representatives of the peoples of the Republic of Serbia and the Republic of Montenegro, which states that the Federal Republic of Yugoslavia continues

(Ms. Mendes, Portugal)

"'the State, international legal and political personality of the Federal Socialist Republic of Yugoslavia'". (A/46/905, annex)

That Declaration raises questions related to the continuity of Yugoslavia's membership of international organizations, including the United Nations, which are under consideration. As a matter of fact, the European Community and its member States have not accepted the automatic continuity of the Federal Republic of Yugoslavia in international organizations, including the United Nations. At this stage they reserve their position on the question.

We therefore consider that the participation in this session of the Committee on the Peaceful Uses of Outer Space by the delegation in question is without prejudice to future decisions which might be taken by the European Community and its member States on this and related issues.

The CHAIRMAN: The representative of Yugoslavia has asked to speak, and I now call on him.

Mr. VOKZUGIC (Yugoslavia): I should like in connection with the statement just made by the representative of Portugal on behalf of the European Community to place the following comment on record.

On 27 April 1992 the Permanent Mission of Yugoslavia delivered an official note to the Secretary-General informing him that the Assembly of the Socialist Federal Republic of Yugoslavia, at its meeting held on 27 April 1992, promulgated the Constitution of the Federal Republic of Yugoslavia. Under the Constitution, strictly respecting the continuity of the international personality of Yugoslavia, the Federal Republic of Yugoslavia shall continue to fulfil all the rights conferred upon and the obligations

(Mr. Vokzugic, Yugoslavia)

assumed by the Socalist Federal Republic of Yugoslavia in international relations, including its membership in the United Nations and all other international organizations, as well as participation in international treaties ratified or acceded to by Yugoslavia.

The Federal Republic of Yugoslavia, as a founding Member of the United Nations, acknowledges its full commitment to the world Organization, to the United Nations Charter and, as a founding participant State, to the Conference on Security and Co-operation in Europe (CSCE) and all CSCE documents.

Finally, I would like to note that my delegation considers that the Committee on the Peaceful Uses of Outer Space is not the proper place for raising such issues.

The CHAIRMAN: In connection with the point of order raised this morning, I wish to inform delegations that this Committee is a subsidiary body of the General Assembly and, therefore, questions of its membership are decided by the General Assembly. Accordingly, it is not up to this Committee to decide on the matter raised this morning, which should properly be raised in the General Assembly. I shall therefore bring the matter to the attention of the President of the General Assembly. On that understanding, I wish to continue with the work of the Committee.

STATEMENT BY THE CHAIRMAN

The CHAIRMAN: I shall now make a statement in my capacity as Chairman of the Committee on the Peaceful Uses of Outer Space.

Yesterday I was privileged to welcome you, representatives of delegations and of governmental and non-governmental organizations, to the special meeting

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of the Committee on the Peaceful Uses of Outer Space commemorating International Space Year. During the panel discussion on new approaches to international cooperation in space in a changing world, we heard statements by and held discussions with four very distinguished members of the international space community. I should like to express our appreciation and thanks to them and to all others who contributed to making the commemorative meeting a truly special celebration of International Space Year.

Today I welcome you again. I do so with a sense of anticipation, not only because this is International Space Year (ISY) - and we have high hopes for this Year - but also because we are at a very special point in time. As we discussed yesterday, the world is changing politically, economically and socially, and we must be prepared for those changes. Advances in space and other technologies are being made daily and, as I have said repeatedly, our accomplishments in this Committee can have only a positive impact on those factors. Therefore, it is with eagerness that I look forward to our work during this, the thirty-fifth session of the Committee on the Peaceful Uses of Outer Space.

Before discussing recent developments in the peaceful uses of outer space and the work of the Committee's two Subcommittees during the past year, I should like on behalf of the Committee to express our heartfelt appreciation to Mr. Flavio Miragaia Perri of Brazil. He has served this Committee unselfishly as its Rapporteur for many years. Mr. Perri was a part of the recently completed United Nations Conference on Environment and Development in Brazil, and I am sure he is currently basking in the glow of its success.

(The Chairman)

I should like also to extend the Committee's thanks to its Vice-Chairman, Ambassador Aurel Dragos Munteanu, Permanent Representative of Romania, and to the Chairmen of the Committee's Scientific and Technical Subcommittee, Mr. John H. Carver of Australia, and of its Legal Subcommittee, Mr. Vaclav Mikulka of Czechoslovakia, for their efficient and dedicated guidance of those subsidiary bodies.

The year 1992 marks the thirty-fifth anniversary of the first satellite launch and the thirtieth anniversary of the first cooperative international launches. In 1962 the United Kingdom's Ariel-1 and Canada's Alouette-1 spacecraft were launched by United States launchers to make observations of the upper atmosphere and the space environment.

(The Chairman)

In International Space Year, with its theme of "Mission to Planet Earth", it is noteworthy that international cooperation in space began with scientific studies of the planetary environment. Many of the activities now being undertaken as part of ISY will be continuing the study and monitoring of the global environment. The importance of space technology and of international cooperation in this increasingly important area can hardly be overemphasized.

Preliminary results from the first "Mission to Planet Earth" spacecraft are now becoming available. Data from the Upper Atmosphere Research Satellite (UARS), for example, are providing new insight into the changes in the protective ozone layer in the upper atmosphere and the processes which control it. UARS, which was successfully deployed from the space shuttle Discovery in September 1991, has produced global maps showing details of the Antarctic ozone hole and the first global-scale measurements from space of chlorine monoxide, a molecule that plays a key role in the catalytic destruction of ozone. In addition, UARS observed the large plume of sulphur dioxide from the eruption of Mount Pinatubo in the Philippines, monitored its global diffusion and measured ozone concentrations within the plume.

Two other "Mission to Planet Earth" activities were undertaken in 1991. In August a Tsiklon rocket was launched from the Russian Plesetsk cosmodrome, carrying a Meteor-3 spacecraft with a United States total ozone mapping spectrometer on board. This instrument serves as a complement to the similar instrument on board the older United States Nimbus 7 satellite. Earlier in August an instrument for studying solar ultraviolet radiation was flown on the space shuttle Atlantis, providing further information for the study of the distribution of ozone in the atmosphere.

The space shuttle will also be used for a series of Spacelab missions called the Atmospheric Laboratory for Applications and Science, or ATLAS, as

(The Chairman)

part of the "Mission to Planet Earth" programme. The first of these missions took place in March-April of this year, with a variety of instruments to measure atmospheric and solar phenomena related to global change.

International Space Year activities will also benefit from the data provided by new remote-sensing satellites. In addition to already proven satellites, including the United States Landsat, the French SPOT, the Indian IRS, and the Russian Resurs spacecraft, a new generation of remote-sensing satellites is now beginning operations. ERS-1, the European Space Agency's first remote-sensing satellite, was successfully placed into orbit by an Ariane launcher in July 1991, and it has begun producing radar images of land, oceans and ice that will provide new information for resource-management and scientific analysis. Further space radar data are now being provided by the Japanese earth resources satellite, JERS-1, which was launched in February 1992. The all-weather capability of these radar satellites will be particularly useful for areas of persistent cloud cover, where regular coverage by multispectral sensors has been difficult to acquire.

In the field of maritime communications, a new distress-call system that was recently tested will enable rescuers to receive SOS messages via INMARSAT satellites within minutes, avoiding the delays of up to several hours that occur with current systems using ground networks or low-orbiting satellites. The system, called INMARSAT E, uses small buoys which automatically switch on when they hit the water and start transmitting a coded SOS signal to one of the four geostationary INMARSAT satellites. The system will be operationally available later this summer. The importance of satellites for maritime safety is indicated by the fact that the International Maritime Organization has ordered all ships of 300 tons or more to install COSPAS-SARSAT or INMARSAT E emergency position-indicating radio beacons by August 1993.

(The Chairman)

In the field of human spaceflight, the Russian space station Mir continues to serve as a base for space research and applications. It carries a permanent crew of two cosmonauts, and the periodic crew-replacement flights are used for short visits by international cosmonauts. This was the case of the October 1991 flight of the first Austrian and Kazakh cosmonauts, and of the flight in March this year of a German cosmonaut. A flight of a French spationaut is planned for next month.

The Spacelab Life Sciences mission, SLS-1, which flew in June 1991, was the first space shuttle mission dedicated entirely to space life sciences. With 17 primary experiments, the mission carried out a comprehensive set of physiological studies in space. Investigators from Australia, Canada, France, Germany, the Russian Federation, Switzerland and the United States conducted flight experiments. The results of SLS-1 have provided new insights into human adaptability to extreme environments and will provide a better understanding of the health parameters that should be monitored in space.

A second Spacelab mission of major importance was the International Microgravity Laboratory mission, IML-1, which flew in January 1992. Thirteen countries contributed experiments to the mission, which featured an international crew of astronauts from Canada, Germany - representing the European Space Agency (ESA) - and the United States. NASA's international partners - the ESA and the space agencies of Canada, France, Germany and Japan - contributed eight major research facilities to IML-1. The mission was devoted to life sciences and material sciences, with the primary objective of studying the effects of microgravity on living organisms and material processing. The life sciences investigations addressed a variety of topics in human physiology, human performance and the space radiation environment.

(The Chairman)

While vigorous discussions continue over the appropriate roles for robotic and human space activities, the recent first flight of the new space shuttle Endeavour proved that human presence in space can be necessary for solving unforeseen problems. Endeavour's primary mission, capturing a stranded Intelsat 6 communications satellite, proved more difficult than envisioned, and required much improvisation, including an unprecedented spacewalk by three crew members. The successful rescue and relaunch of the Intelsat 6 satellite provided experience for more demanding future operations, such as servicing the Hubble space telescope or constructing complex structures like the space station Freedom.

Allow me to mention another anniversary in the short history of the space age. It will be 30 years in August since the launch of the Mariner 2 space probe, which provided the first direct measurements of the dense and hot atmosphere of the planet Venus. The discovery of the intense greenhouse-effect conditions on Venus was important not only for planetary scientists, but for increasing our understanding of terrestrial ecological conditions.

Now, 30 years later, scientists from Australia, France, the Russian Federation and the United Kingdom are participating in the radar exploration of Venus by the United States Magellan spacecraft. NASA recently published the first global maps of Venus, clearly displaying impact craters, volcanoes shaped like pancakes, intricate networks of fractures and a mysterious lava channel that extends for a distance of 6,800 kilometres. A second round of mapping, completed in early 1992, has filled in most of the gaps in the first map and allowed researchers to study changes between the two series of observations. A third cycle of mapping is now under way.

(The Chairman)

Against that background, let us now turn to the agenda items that are before the Committee. Once again, the General Assembly has requested the Committee on the Peaceful Uses of Outer Space to continue to consider on a priority basis ways and means of maintaining outer space for peaceful purposes and to report thereon to its forty-seventh session. This is an item of which the Committee has been seized for many years. Slowly but surely we have continued to inch our way towards reaching broad consensus agreement. I am heartened by the fact that the debate continues to be vigorous, which indicates that the international community is taking seriously its obligation to promote international cooperation in the peaceful uses of outer space and, in particular, the needs of developing countries, so that all may benefit from the steadily improving technology. The Year should also present a wonderful opportunity to broaden and deepen such coopoeration in outer space.

We have before us the report of the Scientific and Technical Subcommittee on the work of its twenty-ninth session (A/AC.105/513). In accordance with the Committee's recommendations, which the General Assembly endorsed, the Subcommittee once again discussed several priority items.

The Subcommittee again jointly considered the two priority items dealing with the United Nations Programme on Space Applications and the implementation of the recommendations of UNISPACE 82, and it reestablished, for the sixth time, its Working Group of the Whole to evaluate the implementation of these recommendations, and its report is contained in annex II of the Subcommittee's report. I should like to congratulate the Chairman of the Working Group of the Whole, Mr. Muhammed Nasim Shah of Pakistan, for the way he has systematically maintained the Working Group's tradition of efficiency.

As members will recall, the Working Group decided at its previous session to undertake this year a comprehensive assessment of the implementation of the

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recommendations of UNISPACE 82 and requested the Secretariat to prepare to assist it in that task a background paper, document A/AC.105/504, which took into account the reports prepared previously. Thus, in making its assessment the Working Group focused on three main areas, namely, short-term training and long-term education, international cooperation and information, studies and technical advisory services. In each of these areas the Working Group reiterated its past recommendations and made new proposals for strengthening them.

However, while noting with satisfaction the valuable efforts to implement the recommendations of UNISPACE 82 made by the United Nations, Member States and other relevant international organizations, the Working Group could not fail to observe that in 1992, the tenth anniversary of UNISPACE 82, several of these recommendations had yet to be implemented. The Working Group's conclusions, therefore, were very precise and named three areas in which efforts had particularly to be intensified.

In the stimulation of the growth of indigenous nuclei and an autonomous technological base in space technology in developing countries the Working Group recalled the UNISPACE 82 recommendations that there should be free exchange of scientific and technological information and an arrangement for the transfer of technologies to promote the use and development of space technology in the developing countries. In the Group's view, a greater international understanding needed to be evolved to overcome the difficulties faced by the developing countries in this respect.

Regarding the promotion of a greater exchange of actual experiences with space applications, the Working Group recalled that 10 years ago UNISPACE 82 had recommended that appropriate assistance be given, particularly by

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international financial agencies, to support demonstration projects to provide opportunities for gaining hands-on experience in space-technology applications for the developing nations through their direct involvement in such applications projects or pilot projects.

And, finally, on funding support, the Working Group regretfully noted that the budgetary allocations for the Programme on Space Applications for the implementation of these recommendations had been meagre and inadequate. It has therefore asked the Committee to request the General Assembly to make an adequate budget allocation for this Programme, with the understanding that priority would be given to the full implementation of the Programme in the available resources of the regular Outer Space Affairs budget. The Working Group also concluded that in formulating cooperative programmes and projects the intensive participation of international and regional financial development institutions should be encouraged by the United Nations.

These are some of the proposals and recommendations of the Working Group. I will leave further discussion for our debate. I should, however, like to stress that the UNISPACE 82 recommendations will not be implemented if we fail to give serious consideration to the Working Group's assessment and the recommendations contained therein.

With regard to the Programme's schedule of work, the Subcommittee commended the work carried out during the past year, reviewed progress on the 1992 activities and approved the proposed programme for 1993. At the risk of being repetitious, I would draw attention once more to the Subcommittee's appeal for support for the Programme through voluntary contributions. Like Dr. Peter Jankowitsch, I too believe that this appeal dserves the serious consideration of the United Nations family and, in particular, the strong

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support of the members of the Committee. Also, while we are discussing the Programme's work, a number of Member States, as you know, have offered to host the regional centres for space science and technology education. I should like to echo the Subcommittee's hope that those Member States and agencies that are in a position to assist will make every effort do to so.

Matters relating to remote sensing of the Earth by satellite, another priority item, received their share of attention from the Subcommittee, which reiterated its views that these activities should take into account the need to provide appropriate and non-discriminatory assistance to meet the needs of the developing countries, that it was important to make remote-sensing data and analysed information openly available to all countries at reasonable cost and in a timely manner and that there was a need for continuing free access to data from operational meteorological satellites. A request has been made that this item be retained as a priority item on the agenda.

Last year some concern was expressed about the direction being taken in the Subcommittee's debate on the question of nuclear-power sources in outer space. I am happy to report that even though, at this session, whether or not draft priniciple 3 should be reopened for discussion was again debated at some length, progress was indeed made in finding acceptable compromises to the differences at hand. The Working Group on this item, which had not met formally at the last session, was reconvened to resume its work under the chairmanship of Professor Carver, and its report is contained in annex III to the Subcommittee's report.

For its part, the Subcommittee has agreed that Member States should be invited to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear-powered

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satellites, that further studies should be conducted on the problem of the collision of nuclear-power sources with space debris and that it should be kept informed of the results of such studies. The Subcommittee has also recommended that the item be retained on its agenda and that the question of reconvening the Working Group be considered by the Committee at its current session in the light of the work carried out this year by the Legal Subcommittee.

In discussing the items dealing with space-transportation systems, examination of the physical nature and technical attributes of the geostationary orbit and space communications, the Subcommittee reviewed the national and cooperative programmes and stressed once again the importance of international cooperation in these fields in order to provide all countries with access to the benefits of space science and technology. The Subcommittee will continue to consider these items.

With regard to the scientific matters relating to life sciences, including space medicine, the geosphere-biosphere (global change) programme, planetary exploration and astronomy, the Subcommittee heard special presentations by experts of various countries and international organizations. In accordance with the wishes of the Assembly, the Subcommittee paid special attention to the theme of the session, "Space technology and the protection of the Earth's environment: development of endogenous capabilities, in particular in the developing countries".

(The Chairman)

I cannot overemphasize the importance of continued joint international efforts, including the sharing and exchange of information, in research and development of these vital areas.

If I may, I should like personally and on behalf of the Committee to thank the Committee on Space Research (COSPAR) and the International Astronautic Federation (IAF) for sponsoring and assisting in the organization of a most interesting symposium on the 1992 them, as part of the Subcommittee's special commemorative ISY session. The theme fixed for special attention in 1993 is "Space-based communication: the expansion of current services and increased understanding of new systems and the services they will make possible". The Subcommittee has once again recommended to the Committee that COSPAR and IAF, in liaison with Member States, be invited to arrange a symposium, with as wide as participation as possible, to complement discussions on the special theme.

While they were not formal items on the Subcommittee's agenda, there was nevertheless a healthy discussion in the Subcommittee on International Space Year and on the question of the space and Earth environment. I would therefore like to make a few brief remarks on these topics.

We are now in the middle of International Space Year, and activities are continuing apace. The Subcommittee noted that a wide variety of national and international programmes are being undertaken as part of the Year, including the activities being coordinated through the Space Agency Forum on ISY (SAFISY), COSPAR, IAF and the International Society for Photogrammetry and Remote Sensing (ISPRS). It noted in particular the plans for the World Space Congress being organized jointly by COSPAR and IAF, including activities organized in cooperation with the United Nations. Most importantly, the

(The Chairman)

Subcommittee noted, as do I, the importance of including all countries in those programmes and of planning activities that would continue beyond 1992.

The United Nations Conference on Environment and Development (UNCED), as all members know, was completed three days ago. Nevertheless, I should like to recall that the General Assembly last year reiterated its recommendation that Member States, in planning their activities for ISY, consider ways in which those activities could complement UNCED. Since I see UNCED not as an end in itself but as the beginning of the concerted international struggle to protect our environment, which is being more gravely threatened each day, I urge Member States to heed the Assembly's recommendation. Bearing this in mind, I am extremely pleased that the major focus of ISY activities is the use of space technology for studying and monitoring the environment.

This brings me to the Subcommittee's discussion of the space and Earth environment. It is my view that, ultimately, the problem of space debris, its growth and its extremely hazardous effects on the outer space - and potentially the Earth's - environment will have to be faced head-on by the international community. The General Assembly has again indicated in its latest relevant resolution that space debris could be an appropriate subject for in-depth discussion by the Committee. The Subcommittee has agreed, among other things, that it should receive information on national research on this topic. I hope our Committee will play its part in speeding up the efforts to reach agreement on how this worsening problem should be collectively handled.

I should like to discuss now the work of the thirty-first session of the Legal Subcommittee, the report of which is contained in document A/AC.105/514.

The Subcommittee re-established its Working Group on Nuclear Power Sources, ably chaired by my countryman, Mr. Cede, with the aim of finalizing the draft set of principles at this session. Although the Working Group did

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not succeed in doing so, it managed, through intensive informal consultations, to move closer to that aim. The Chairman's report on the Working Group's activities, which is annexed to the report of the Legal Subcommittee, contains two working non-papers reflecting his views of the results of the discussions conducted with regard to the preamble and draft principle 12, and to draft principles 1A and 4. The Subcommittee has agreed that the working non-papers might be considered at this session of the Committee as a contribution to meeting the aim set out in General Assembly resolution 46/45. I suggest that we give serious consideration to this item so that we can finalize the draft set of principles on the use of nuclear power sources and, I hope, commend it for adoption by the General Assembly this fall, which would indeed be a fitting contribution by the United Nations to the ISY activities.

The re-established Working Group on matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, once again, decided to divide its discussions on this item into two parts. Under the able chairmanship of Mr. Estanislao Zawels of Argentina, whose report is annexed to the Subcommittee's report, the Working Group focused its discussion of the definition and delimitation of outer space on a working paper entitled "Questions concerning the legal regime for aerospace objects", submitted at its current session by the Russian Federation. I am pleased to report that the Working Group has agreed that the approach suggested in this working paper was a positive one and could form a suitable basis, among other bases, for future discussions.

With regard to the geostationary orbit, the Working Group based its discussion on the working non-paper which had first been circulated at the 1991 session, as well as on various other oral proposals. In his report on this question, the Chairman expressed the view that the substantial exchange

(The Chairman)

of views had been characterized by a constructive and positive atmosphere. Details of these discussions are also contained in annex II of the Subcommittee's report.

The Working Group on the question of outer space benefits, re-established under the experienced chairmanship of Mr. Raimundo Gonzales of Chile, conducted a preliminary but detailed exchange of ideas on the provisions of the working paper entitled "Principles regarding international cooperation in the exploration and utilization of outer space for peaceful purposes", submitted by a number of countries of the Group of 77 at the end of the Working Group's last session. The Chairman's report, contained in annex III to the Subcommittee's report, summarized the views expressed in the Working Group on this item.

Although, in our impatience, we may wish to see faster progress on some of the items before the Legal Subcommittee, I am heartened by any forward movement that is made, since, as has been noted before, it signifies the continuing role of the United Nations in developing international space law and ensuring that the access, benefits, understanding and utilization of outer space and its technologies are made available for all humankind.

With regard to the working methods and the venue of the Legal Subcommittee, as members know, the General Assembly and its relevant Committees have made some recommendations, and I am happy to note that the Subcommittee has taken several measures to improve its working methods, as reflected in paragraphs 12 to 15 of its report. We will review this matter at our next session, in 1993, as agreed to at our meeting last year in Graz.

I have introduced the reports of the two Subcommittees in the hope that our Committee will spend the next two weeks in productive discussions so that we will be prepared to offer these bodies meaningful guidance.

(The Chairman)

Regarding the other items on the agenda of this Committee, I have already spoken in some detail, in the context of the report of the Scientific and Technical Subcommittee, on the implementation of the recommendations of UNISPACE 82. Therefore, if I may, I should like briefly to turn our attention to the item "Spin-off benefits of space technology: review of current status". Last year, the Committee had a spirited discussion on this item and agreed that there was a need to examine ways to strengthen and enhance international cooperation in this field, through, inter alia, improved means of providing access to spin-offs for all countries, with particular attention being given to those spin-offs that could address the social and economic needs of developing countries. Perhaps at this session the Committee may wish to devote some of its attention to just such an examination of this important question.

(The Chairman)

That concludes my review of the items on the agenda of the Committee and of what we may wish to accomplish during this session. As I said at the beginning of this statement, the remarkable developments of the past year have further convinced me of the importance of the work of our Committee and of its responsibility, as the focal point for international cooperation in the peaceful uses of outer space, to ensure that any benefits derived from the promotion of international cooperation in this sphere be shared by all nations and by all people. In this International Space Year, 1992, the Committee has had and will continue to have the opportunity to examine the ways in which it can gear itself towards the changes of the 1990s, so that the space age may become part of the international global effort to promote and maintain international peace and security. Let us hope that at this session we grasp the opportunity.

STATEMENT BY THE CHIEF OF THE OFFICE FOR OUTER SPACE AFFAIRS

The CHAIRMAN: Before we begin the exchange of views, I call on the Chief of the Office for Outer Space Affairs to make a statement.

Mr. JASENTULIYANA (Chief of the Office for Outer Space Affairs): In response to requests by delegations at past sessions of the Committee, I would like to provide a brief review of the work of the Office for Outer Space Affairs over the past year and of the documents that are before the Committee.

Concerning the organization of the Secretariat, in February of this year the new Secretary-General, Mr. Boutros Boutros-Ghali, initiated a process to restructure and streamline the Secretariat in order to enable it to meet its new and expanding responsibilities. As part of that process, the Outer Space Affairs Division has been renamed the Office for Outer Space Affairs. The Office retains the internal structure and the mandate of the Division, with a few personnel changes. The Office is now part of a new and expanded

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Department of Political Affairs, which combines the responsibilities of a number of former Departments and Offices, including those responsible for the General Assembly, the Security Council, disarmament, regional cooperation and decolonization. The Office for Outer Space Affairs will be reporting to the Under-Secretary-General for Political Affairs, Mr. Vladimir Petrovsky.

To support the growing responsibilities of the United Nations in the area of peace-keeping, three former staff members of the Office have recently been assigned to peace-keeping missions, two in Cambodia and one in Angola. Three new staff members have been recruited or transferred to replace them: Ms. Maria-Luisa Chavez, a national of Mexico; Mr. Gregor Boventer, a national of Germany; and Mr. Bruce Schoenfeld, a national of the United States. I am pleased to note that Ms. Chavez and Mr. Boventer are former members of our Office who are returning following assignments to other units of the United Nations.

The net result of this reorganization is that the Office has lost one temporary post to peace-keeping and has gained another post, which, in accordance with the priorities expressed by members of the Committee, has been assigned to the Programme on Space Applications, further strengthening the Space Applications Section. As I have noted in the past, in addition to the staff fully dedicated to the Programme on Space Applications, all other staff of our Office also support the Programme as required, and all of the non-staff financial resources availabale to the Office are devoted to the Programme on Space Applications, primarily for the participation of developing countries in Programme activities. I might note that the regular budget allocations for the Programme have remained at essentially the same level for the past several years.

(Mr. Jasentuliyana)

Despite the very limited regular budget resources available, our Office has been able to maintain an effective Programme on Space Applications thanks to generous voluntary contributions. The regular budget resources have been used as seed money to obtain support from Member States, specialized agencies of the United Nations system, and other international organizations. I would like particularly to note the generous support provided by the European Space Agency and the host countries that have provided local facilities, transportation and accommodations for Programme activities. It should be noted that, on average, the regular budget provides less than one third of the total costs of the training courses, seminars and workshops organized under the Programme.

The reports of the 1991 activities of the Programme on Space Applications, and information on the 1992 activities now being carried out, were submitted to and reviewed by the Scientific and Technical Subcommittee, as indicated in its report. The proposed activities for 1993 were reviewed by the Subcommittee and recommended for approval by this Committee. Subject to the approval of this Committee and the General Assembly, planning for the 1993 activities is now under way. The staff of the Office for Outer Space Affairs has made great efforts to ensure the effective and efficient organization of these activities, and I would like particularly to acknowledge the hard work that the Expert on Space Applications, Dr. Abiodun, has done in coordinating this programme. He will be providing more detailed information to the Committee on the activities of the Programme on Space Applications.

Following the recommendation of the Committee, one of the major efforts currently being undertaken by the Office in implementation of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) recommendations is to establish regional Centres for Space

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Science and Technology Education in developing countries. A report on those efforts was submitted to the Scientific and Technical Subcommittee, and further information will be provided by the Expert.

An important priority this year for the Office for Outer Space Affairs, and particularly for the Programme on Space Applications, is the participation of the United Nations in International Space Year (ISY). Members may recall that the General Assembly, in 1989, endorsed the Committee's recommendation that the United Nations, through the Programme on Space Applications, should play a meaningful role in International Space Year, through voluntary contributions by Member States and without impact on the regular budget or the existing programme of work.

At its 1991 session, the General Assembly, in resolution 46/45, urged Member States and international organizations to support the activities of the United Nations as part of ISY. On the basis of contributions by Member States and other organizations, and in accordance with the Committee's recommendation that the activities should make use of the training and educational capabilities of the Programme on Space Applications, the Office has developed and is undertaking a programme of activities with an emphasis on promoting the participation of developing countries in ISY. The year 1992, I might note, also marks the tenth anniversary of the UNISPACE 82 Conference, which provided an expanded mandate for the Programme on Space Applications.

In order to assist the United Nations in planning and organizing ISY activities without affecting the regular budget or the existing work programme, the Government of Japan has provided, as a voluntary contribution to the Office for Outer Space Affairs, the services of a staff member, Mr. Yutaka Hishiyama from the Science and Technology Agency of Japan. Mr. Hishiyama is providing valuable assistance to the Office in its work on

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ISY activities, and I would like to express our appreciation to the Government of Japan for this valuable contribution.

The programme for the participation of the United Nations in ISY was submitted to the Scientific and Technical Subcommittee in a booklet entitled Guide to the Participation of the United Nations in the International Space Year - 1992, and updated in the report of the Expert on Space Applications to the Scientific and Technical Subcommittee. In addition to the training courses and workshops being organized as part of ISY, the office will be issuing a number of public information publications this year, including a booklet on space education, a booklet on "Mission to Planet Earth" programmes, and a publication on the organization of planetariums and their role in education. The Office is also collaborating with the annual children's poster exhibit for the World Gratitude Day Foundation, which this year is honouring International Space Year. In addition to the activities being undertaken by our Office, the United Nations Postal Administration will be issuing a commemorative stamp in September on the theme of International Space Year, "Mission to Planet Earth".

In relation to the United Nations Conference on Environment and Development in Rio de Janiero, which closed Sunday, our Office has made efforts over the past year to support the preparations for the Conference, particularly in light of the similarity between the topic of the Conference and the theme of International Space Year: "Mission to Planet Earth".

(Mr. Jasentuliyana)

Our Office provided information for inclusion in the documentation for the Conference, and one of our staff members was part of the Secretariat for the preparation of the Framework Convention on Climate Change, which was adopted and opened for signature in Rio de Janiero. However, owning to the concentration of the Conference on political and financial issues, there was limited opportunity for inputs on the contribution of space technology for monitoring the environment and supporting sustainable development. Our Office will be monitoring the follow-on to the Conference and will provide whatever support it can towards integrating space technology into international environment protection programmes.

One area in which the Office for Outer Space Affairs has been working to provide additional services to Member States has been the International Space Information Service. The establishment of this service was recommended by the UNISPACE 82 Conference and decided by the General Assembly in its resolution 37/90 in 1982. In view of the available resources, however, rather limited progress has been possible towards the implementation of the Service. The Office is now in the process of developing a modest computer information processing capability, with the objective of improving our ability to respond to requests for information from Member States.

As part of the work of the Office in developing the International Space Information Service and promoting the exchange of information on space activities, particularly activities relating to developing countries, we have published and distributed a number of documents relating to space applications for development. This year, for the the third time, we published and submitted to the Scientific and Technical Subcommittee a collection of selected technical papers from the seminars, workshops and training courses of

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the Programme on Space Applications. The papers in this collection were selected primarily on the basis of their general interest to developing countries. We plan to publish such collections annually, and we hope that this series can make a significant contribution to the need identified by the UNISPACE 82 Conference for improvements in the exchange of information concerning space applications in and for developing countries.

As part of the International Space Information Service, and in response to a request from the Scientific and Technical Subcommittee's Working Group of the Whole, the Office this year prepared and submitted to the Subcommittee two technical studies, one on the applications of space technology to desertification, and one on space applications for integrated land and water development. Additional technical studies, as proposed by the Working Group of the Whole at its last session, will be submitted to the Subcommittee at its next session, in 1993.

We are also now preparing, for publication this year, updated versions of three directories of information on space activities of international interest. These publications are: Space Activities of the United Nations and International Space Organizations; the Directory on Education, Training, Research and Fellowship Opportunities in Space Science, Technology and Applications; and the Directory on Information Systems on Space Science and Technology. These publications should be available for distribution at the International Space Year World Space Congress in August.

I would also note that information on the space activities of Member States that has been received since the Scientific and Technical Subcommittee met, including information requested by the Committee and the Subcommittee, is contained in document A/AC.105/505/Add.2, which is before the Committee.

(Mr. Jasentuliyana)

For the Scientific and Technical Subcommittee this year, the Committee on Space Research (COSPAR) and the International Astronautical Federation (IAF), in cooperation with our Office, organized a special session to commemorate International Space Year, including a panel discussion on "Space and the Global Change Programme", and a "Symposium on Space Technology and the Earth's Environment". In addition, a number of Member States and international organizations arranged special presentations on the special theme or on other agenda items.

Recognizing that these presentations contained much interesting and valuable information on the latest developments in space applications of interest to the international community, the Office has again prepared a summary of those presentations, which is being distributed to the Committee in document A/AC.105/516. I should like to acknowledge the work of Mr. Lala and Mr. Chipman in preparing this report.

I should also like to take this opportunity to express our Office's appreciation of the great efforts that have been made by IAF and COSPAR to obtain the services of interesting and knowledgeable speakers for the Symposium.

I should like to mention briefly our Office's cooperation with other international and regional organizations. The coordination of space activities within the United Nations system is carried out through the Inter-Agency Meeting on Outer Space Activities. That meeting serves for the exchange of information on planned space-related activities in order to prevent redundant or conflicting activities and for planning joint and complementary activities, including activities to be organized as part of International Space Year.

(Mr. Jasentuliyana)

The 1991 session of the meeting took place in Geneva at the Office of the United Nations Disaster Relief Coordinator, and the review of the activities to be undertaken by the organizations of the United Nations system in 1992, 1993 and future years was submitted to the Scientific and Technical Subcommittee. The 1992 session of the Inter-Agency Meeting on Outer Space Activities will be held at the United Nations Educational, Scientific and Cultural Organization (UNESCO) headquarters in Paris in October this year, and the report of that meeting will be submitted to the Scientific and Technical Subcommittee next year.

The Office for Outer Space Affairs has had particularly close cooperation with COSPAR and IAF, and I should like to express our Office's appreciation for the support provided by those organizations. Again this year, COSPAR submitted its annual report on progress in space research and IAF submitted its report on highlights in space technology and applications to the Scientific and Techical Subcommittee. These reports were prepared with the assistance of many international experts, and constitute authoritative and up-to-date reviews of the most important developments in the field. In view of their importance, these reports have been combined into a single publication for wider distribution, and will be before the Committee in document A/AC.105/515, yet to be distributed.

I should also mention that the annual Congresses of the IAF and the biennial meetings of COSPAR include activities organized in cooperation with the United Nations on topics of particular interest to developing countries. In conjunction with the 1991 IAF Congress in Montreal, the United Nations, in cooperation with the Canadian Space Agency and the IAF Committee for Liaison with International Organizations and Developing Nations, organized a workshop

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for developing countries on "Space Technologies for Development". The United Nations also co-sponsored a session of the IAF Congress on Space and Agricultural Management.

A major event of International Space Year will be the organization in August-September this year, in Washington, of the joint IAF-COSPAR World Space Congress. In conjunction with that Congress, the United Nations, IAF, COSPAR and the American Institute of Aeronautics and Astronautics are organizing a symposium entitled "Space Technology in Developing Countries - Making It Happen", for participants from developing countries. The United Nations is also working with the Congress organizers to increase the representation of speakers and participants from developing countries.

During the past year, the Office for Outer Space Affairs has again enjoyed generous support from INTELSAT, INMARSAT and, in particular, the European Space Agency, which has given substantial financial and technical assistance for the activities of the Space Applications Programme. I should like to express the appreciation of our Office for their support.

Within the United Nations Secretariat, our Office is working with the Centre for Science and Technology for Development, now part of the Department of Economic and Social Development, in planning a Conference on Technology Assessment of Conversion for Development, and focusing on aerospace techology, to be held in Moscow this year.

In the area of regional cooperation, the Office is assisting the Government of Chile in planning the Second Space Conference of the Americas, scheduled to be held in Santiago in January 1993.

Concerning the conference services for this session of the Committee, I would remind delegates that the work of the interpreters will be greatly

(Mr. Jasentuliyana)

facilitated if delegations can provide the texts of statements to the Conference Officers as long in advance of the statement as possible.

This has been a brief review of the work of the Office for Outer Space Affairs over the past year. As always, the staff of our Office stand ready to assist the work of the Committee and its member delegations in any way we can to promote international cooperation in the peaceful uses of outer space.

GENERAL EXCHANGE OF VIEWS

The CHAIRMAN: I would ask those wishing to speak in the general exchange of views to place their names on the list of speakers as soon as possible, as it is my intention to close the list at the end of this afternoon's meeting.

Mr. RAO (India): On behalf of the Indian delegation I have great pleasure, Sir, in welcoming you again as Chairman of the Committee. We are sure that your long experience in the workings of the Committee and your mature way of handling complex situations will contribute to the making of further progress during this session. We take this opportunity also to express our appreciation to the Chairmen of the two Subcommittees, Mr. John Carver and Mr. Vaclav Mikulka.

We are extremely pleased to note that several member countries have made many notable achievements in space. The successful launching of several satellites by many member countries, the retrieval of INTELSAT by the United States Space Shuttle, the major breakthrough by Russia in successfully testing their scram-jet engine and the remarkable progress made by the European Space Agency (ESA), Japan, China and others in their space programmes deserve the congratulations of us all.

For the Indian Space Programme, this International Space Year (ISY) signifies a period of several important achievements in India's continued effort to acquire self-reliance in space technology and apply it for the benefit of the grass roots of our society. The successful launch of the Indian remote-sensing satellite IRS-1B on 29 August 1991 from Baikonur was a major milestone towards ensuring continued availability of space remote

(Mr. Rao, India)

sensing services to the country. IRS-1B joined its predecessor IRS-1A, which is still operational, in providing a unique opportunity for more frequent imaging, with an 11-day repeat cycle, thus assisting users in monitoring dynamic changes in renewable natural resources. In addition to the utilization of this imagery for many vital applications in the areas of forestry, land use, agriculture, water resources and wasteland delineation on a regular basis, I am pleased to report our recent initiative to use satellite data together with socio-economic information to develop appropriate strategies for achieving integrated sustainable development at the village level. We are firmly convinced that it is only through the implementation of such integrated sustainable development strategies that we can optimally utilize our precious land and water resources to achieve substantially higher agricultural productivity without affecting our environment.

I am very pleased to report the successful launching of our third developmental flight of the Augmented Satellite Launch Vehicle (ASLV) on 20 May this year from our SHAR launch centre; it orbited the 106-kilogramme SROSS-C scientific satellite into a near-Earth orbit. ASLV has been used as a test bed to validate a number of technology elements required for our major operational rockets, the Polar Satellite Launch Vehicle (PSLV) and the Geostationary Satellite Launch Vehicle (GSLV), being developed for launching remote-sensing and geostationary satellites. The SROSS-C satellite, which was placed in orbit, carries two scientific payloads: the Retarding Potential Analyzer, to investigate the characteristics and energetics of the equatorial ionosphere and thermosphere, and a gamma-ray burst detector, for studying celestial gamma-ray bursts and their temporal variations in the energy range

(Mr. Rao, India)

of 20 to 300 IkeV. The ASLV rocket, using all five motors, is an ideal candidate for launching small scientific and application satellites.

It gives me great pleasure to inform the Committee that the first of the second-generation Indian multi-purpose geostationary satellites, INSAT-2A, is scheduled for launch from Kourou, French Guiana, in July this year - that is, next month. The INSAT-2A satellite will carry 18 communication transponders in the C and extended C bands, two high-power S-band transponders, a very high resolution radiometer for meteorological imaging, and a data relay transponder for receiving meteorological data from unattended data-collection platforms. It will also be the first geostationary satellite to carry a satellite-aided search and rescue mission, complementing the Space System for Search for Vessels in Distress-Search and Rescue Satellite (COSPAS-SARSAT) system already in use in India. We hope the successful operationalization of INSAT-2A will facilitate enhanced availability of new services to the country in the areas of telecommunication, meteorology, disaster warning, television broadcasting, radio networking and emergency communication.

I should also like to mention that in the field of space sciences several important activities have been initiated in the context of the International Space Year (ISY). In brief, these include studies related to monsoon, migration of climatic zones, snow-melt variations, changes in atmospheric minor constituents and aerosols, forest ecosystems, cloud radiation interactions and soil erosion, which represent major concerns of the international community in connection with understanding global change phenomena.

(Mr. Rao, India)

In addition to the very fruitful cooperation India has with Russia, Germany, Sweden, the Netherlands and ESA, we have recently signed an agreement with the Government of the People's Republic of China for active cooperation in the peaceful uses of outer space. As part of our commitment to promote international and regional cooperation, India, in September 1991, hosted in Bangalore the fifth meeting of the COSPAS-SARSAT Joint Committee and the eighth Intergovernmental Consultative Committee and Meeting of the Heads of National Remote Sensing Centres for the region of the Economic and Social Commission for Asia and the Pacific (ESCAP), under the sponsorship of the United Nations Development Programme (UNDP), in Hyderabad.

We note with satisfaction the progress made by the Legal Subcommittee in forging a better understanding of principles governing the safe use of nuclear power sources, based on the valuable contributions of the Working Group on nuclear power sources and the draft preamble to the principles, sponsored by our delegation along with the delegations of Australia, Canada, France, Germany, Turkey and the United Kingdom. We need to intensify this work further to arrive at an unambiguous and acceptable agreement on the role, responsibilities and obligations of States launching space objects carrying nuclear power sources on board. Even more important is actively to support and facilitate the implementation of the spirit of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) by providing easy access to technologies, information and hardware to developing countries to enable them to build an indigenous nucleus of space expertise.

(Mr. Rao, India)

Our delegation also wishes to point out the urgent need to converge on strategies to reduce space debris to minimize the risk of collisions in outer space. We strongly recommend that a team of international experts be constituted under the umbrella of the Committee on the Peaceful Uses of Outer Space to evolve acceptable technical strategies to be adopted and to recommend methods for freely sharing such technologies among various spacefaring nations to ensure the safety of all future space missions.

In the context of International Space Year, we note that several cooperative projects and seminars are being organized by various agencies such as the Space Agency Forum for International Space Year, the Committee on Space Research, the International Astronautical Federation, the European Association for the International Space Year and many other national and international organizations. This has been very useful in focusing on problems related to the Earth's environment and in promoting the application of space technology to tackle those problems. We should cash in on the momentum provided by ISY to evolve follow-on actions and mechanisms further to broaden the scope of international cooperation in space on equal and non-discriminatory terms. The Indian delegation would strongly support the organization of a third UNISPACE conference in 1995, preferably in a developing country, to promote increased participation by all developing countries in space activities.

True international cooperation can prosper only in an atmosphere of mutual trust and equality. Self-reliance is the cornerstone of any nation wishing to advance socially, economically and technologically. We are very concerned that, in spite of the removal of cold-war confrontation and the

(Mr. Rao, India)

signing of nuclear-disarmament agreements, unjustified and unreasonable embargoes and sanctions are applied against nations which are striving to build their capability in the peaceful applications of space technology. We urge that all technology transfers and agreements on peaceful applications should be actively encouraged in the true spirit of free enterprise to enable all developing nations to build their own capability and fully exploit the peaceful benefits of space technology.

(Mr. Rao, India)

In conclusion, let us recognize that we are passing through a historic period in which we have the unique opportunity fully to establish the unlimited application potential of space technology for tackling the problems of the vast majority of human beings on Earth, without which the very survival of the future human habitat on this planet is in jeopardy. History will never forgive us if we do not seize this opportunity to establish peace and prosperity through meaningful international cooperation in space. On the other hand, if we can use the new spirit of ISY to enable all nations to benefit from space, we shall have contributed to the making of history in which all nations, developed and developing, North and South, the rich and the poor, will be able to achieve their rightful destiny.

Mr. FREUDENSCHUSS (Austria): Mr. Chairman, since you have already given an exhaustive account of the work done in the field of international cooperation in the peaceful uses of outer space, I may limit my intervention today to a few particularly salient points.

I begin with our work on nuclear-power sources (NPS). We are all aware of how long we have now discussed a draft set of principles, how positions have changed over the years, how new questions and problems have arisen. There has hardly ever been any subject on our agenda to which we have devoted so much attention. Indeed, the outer space Treaty of 1967, a far more difficult work, was accomplished in a much shorter time.

And yet we still have no agreement on NPS. But now we have reached a point where we cannot just go on as we have over the past dozen years. We must - it is now or never - show the necessary political will to overcome the last obstacles and reach a compromise. To hold out for an ideal set of principles from the point of view of the users of NPS and to disregard the

(Mr. Freudenschuss, Austria)

legitimate safety concerns of other States would make a mockery of the principle of international cooperation in the peaceful uses of outer space.

Technology - and space technology in particular - evolves constantly. There will never be a given point in time when any rule or principle completely covers all eventualities. This is why we have a review clause and this is why I suggested at the last meeting of the Scientific and Technical Sub-Committee that we should shorten the review period considerably. The successful conclusion of our work on NPS this year would also be a meaningful contribution to the International Space Year (ISY).

The second point I should like to to comment on today is in a sense related to the first. It concerns the Earth and space environment. In our view, it is becoming increasingly evident that the Committee and its Subcommittees should deal with environmental questions in a more formal and structured way. An agreement to put environmental questions on our agenda would be in the spirit of this year, in the spirit of ISY and in the spirit of the upcoming World Space Congress.

In this context, I should like to draw attention to a project called MERCURE. Its feasibility is currently being studied by experts from seven European countries, including Austria. An idea originally conceived by the United Nations Environment Programme (UNEP) and the European Space Agency (ESA), MERCURE would be a pilot communication system for UNEP, primarily in the service of developing countries. Initially its task would be transfer of and access to data relevant to the environment. At a later stage such a satellite-based communications system could be made available not only to UNEP but also to other relevant specialized United Nations agencies.

Thirdly, and lastly, I should like to say a few words on the implementation of the recommendations of UNISPACE 82, held 10 years ago.

(Mr. Freudenschuss, Austria)

Just like the "new" item in the Legal Subcommittee, this item deals, inter alia, with the benefits derived from the peaceful use of outer space, and with the access to those benefits. While we have had useful discussions in both Subcommittees on these questions, much still needs to be done. The recommendations of the Working Group of the Scientific and Technical Subcommittee point the way.

In this connection I am pleased to announce that Austria made its voluntary contribution to the Space Applications Programme for 1992 a few weeks ago. Our contribution of $20,000 is more than twice as large as last year's and is tangible proof of our continuing commitment to the implementation of the UNISPACE recommendations. We hope that our example will now be followed by more than the handful of other States which have so far made voluntary financial contributions.

Austria, as the host of the 1993 International Aeronautical Federation Congress, is also planning to organize a Workshop on Space Technology in developing countries, to be held in mid-October 1993 in Graz. Both events should benefit from what participants in last year's meetings of this Committee called "the spirit of Graz". This is yet another example of Austrian contributions to strengthening international cooperation in the peaceful uses of outer space, which we intend to continue to increase in the years to come.

Mr. GOURBULINE (Ukraine) (interpretation from Russian): It is an honour to address the Committee for the first time on behalf of the independent State of Ukraine. A year has elapsed since our delegation made a statement in the general debate at the Committee's thirty-fourth session. That year has seen many important events, so many that they are surely enough to last an entire epoch.

(Mr. Gourbuline, Ukraine)

That year has seen many important events, so many that they are surely enough to last an entire epoch.

The restoration of Ukrainian Statehood and the confirmation of Ukraine's place in the world community as a genuinely independent sovereign State, determining its own fate independently and autonomously, were of pivotal importance to my country.

I wish here to affirm Ukraine's adherence to the purposes and principles of the Charter and the generally accepted norms of international law. I also wish to reaffirm our unswerving desire to construct a genuinely democratic society.

Having set out on the path of autonomous State development, Ukraine attaches particular significance to the need to broaden its participation in all spheres of international cooperation. That is certainly very true with regard to space research.

In our opinion, this Committee is a worthy example of the joint efforts of the members of the international community to find ways to solve global problems facing mankind. Ukraine intends to play an active part in this process. We consider that in the years since it was established the Committee has made significant progress and has established a system of generally accepted principles underpinning the use of the benefits of space activity by all countries. Although international problems arising in the sphere of space activities are becoming increasingly complex, we are convinced that the stable tradition of fruitful cooperation and the spirit of compromise which have been preserved in the Committee will make it possible to solve those problems.

I wish to take this opportunity to inform members of the Committee of the main aspects of current Ukrainian policy with regard to space. Space research is one of the priority areas receiving State support in my country, as can be

(Mr. Gourbuline, Ukraine)

Tseen from the presidential decree establishing the National Space Agency, which has been entrusted with coordinating activities of State organs and industrial enterprises in scientific research, the organization and conduct of space activities and questions connected with international and inter-State cooperation.

(Mr. Gourbuline, Ukraine)

Ukraine now has a highly developed scientific and technological base as well as a modern production base in the field of outer space. Its scientific and technological institutes, design offices and industrial enterprises were integrated into the powerful space infrastructure of the former Soviet Union and worked therein within a framework of broad cooperation with counterparts in other countries. As Mr. Gibson remarked, metaphorically, it represents an important element that has survived the disappearance of the Iron Curtain.

We have produced strategic rockets, rocket launchers, spacecraft and related systems as well as basic research equipment well known the world over. Ukraine, however, never approached the various space programmes from an ideological viewpoint. The proclamation of independence has given us the opportunity to develop our own policy in the area of outer space, and we do not intend to pursue the goal of establishing an entirely autonomous space economy, as it were. Today, the main trend throughout the world is to pursue a different goal and establish integrated international efforts and international cooperation in this field. We believe that a first step in such cooperation would be Ukraine's admission to the various international organizations, and in particular the European Space Agency.

Our entry into the broad international sphere of space research does not mean that we intend to disrupt the established and mutually advantageous links with our partners in the Commonwealth of Independent States, primarily Russia. We understand the importance of the need to retain those links, and Ukraine has also ratified a number of agreememts in the area of space research and the uses of outer space that were signed within the framework of the Commonwealth in Minsk and Tashkent. After some discussion, we have resolved the conflict that arose with regard to the latter agreement and have become

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the tenth State to adhere to it. We have also signed an important agreement on solar research and near-Earth space.

We are working hard to set up a national space programme for Ukraine, designed to improve the well-being of the Ukrainian people by acquiring and introducing various kinds of space research and technology for science and industry. The main elements of the programme will be basic scientific research, data processing and communications technology, the study and economic monitoring of Earth's natural resources and their rational use, the development of space resources and questions of national security.

With regard to the utilization of outer space, the policy of Ukraine is to acquire resources that will enable it to provide for its national security without detriment to the interests of other States. Ukraine is opposed to the militarization of outer space. We view our security as an integral part of international security as a whole and as linked to the establishment of a system of relationships between and among States in which the threat of war or military conflict will no longer be a question. We are prepared to take every necessary step to see that our State ratifies universal conventions on the peaceful uses of outer space.

The Ukraine National Space Agency will take an active part in elaborating the inter-State programme of the countries members of the Commonwealth of Independent States for the development of outer-space activities. That programme provides for continued work on projects that were formerly being carried out in the Soviet Union and includes a number of projects in which the scientific organizations and industrial enterprises of Ukraine play a leading role. These include, inter alia, the plan for the establishment of a new, all-purpose automated space station oriented on the Sun, which is to be

(Mr. Gourbuline, Ukraine)

launched in 1992-1995. The station would carry forward the international CORONAS I, CORONAS F and PHOTON projects, which are designed to study the Sun's internal structure and dynamics. The launching of spacecraft under those projects will be carried out by a CYCLON rocket.

Joint research is also envisaged on the APEX satellite, which was launched in December 1991. That craft has now been in orbit for half a year, but the data already obtained on the Earth's magnetosphere and ionosphere are equivalent to the data that might have been gathered by 200 ordinary rocket launchers. APEX was created by Ukrainian and Russian scientists and can rightly be regarded as representative of a new generation of orbital laboratories.

Another project being implemented under our inter-State programme is the OCEAN-O spacecraft, designed for remote Earth sensing for fundamental research into both oceans and land masses and for carrying out applied tasks for rational land use and the ecological monitoring of atmosphere, land and water. Ukrainian scientists and manufacturers played a leading role in the creation and launching of this spacecraft, and it is to be launched by the Zenith-2 rocket manufactured by the Yuzhnaya Company in Dnepropetrovsk.

With regard to the spacecraft constructed in Dnepropetrovsk, we might point out that their fundamental operational characteristic is their universality, an element that could make them important to international projects. At present, Earth-oriented space platforms for geophysical research are available at orbits of 500 and 2,000 kilometres. Another platform is focused on the Sun and designed to develop specialized spacecraft for both heliophysical and geophysical research at orbits between 500 and 600 kilometres. We also have an Earth-oriented space platform for the development

(Mr. Gourbouline, Ukraine)

of specialized remote-sensing spacecraft to function in solar synchronized orbits at 600 to 900 kilometres. Space platforms are also being developed for specialized spacecraft for telecommunications.

The space equipment so far built and being developed for future use by our National Space Programme will enable Ukraine to offer its services in the development of such joint projects as the establishment and operation of international space transport systems and spaceports and the development of spacecraft for Earth observation and the dissemination of information obtained through satellite communication, as well as providing additional loads for rocket launchers under various programmes.

(Mr. Gourbuline, Ukraine)

We are prepared to take part in broad cooperation regarding the use of rocket-launchers. In this respect, the main areas we can cover are the provision of TSIKLON and ZENIT rocket-launchers for launching of spacecraft from the Baikonur and Plesetsk space centres; and the supply of rockets to foreign countries for launching spacecraft from their own territories - and the most promising proposal in this regard is one from Australia, for bringing to Cape York a facility for the launching of the ZENIT rockets. Also, we are engaged in the joint development of rocket-launchers for commercial activity and the supply of individual units and rocket systems. We also have proposals for the establishment of commercial space and aviation systems, known as Space Clippers, based on the heavy transport aircraft MRIA and unified solid-fuel rocket-launchers. Finally, I wish to mention the use of strategic rockets - which are no longer in military service - in launching commercial payloads. After a brief reconversion, these rockets can be used to perform industrial tasks. At the present time, a group of Ukrainian and Russian enterprises are involved in a project to set up a Telex space technology system. In fact, a joint-stock corporation called Space Industry has been set up for this purpose. A number of foreign countries have shown interest in it, and we hope it will become the focus of attention of the entire world community. The particular significance of this project is the direct conversion of strategic offensive systems.

The enterprises in the space infrastructure of Ukraine, together with enterprises in Russia, are developing systems for monitoring seismic activity on Earth and for the short-term forecasting of earthquakes. Proposals for the development of such a project were adopted by the Committee for further discussion at the international level, and a special United Nations-sponsored

(Mr. Gourbuline, Ukraine)

seminar is to be held for this purpose. Given the current relevance and importance of forecasting earthquakes to the world community, and also in light of the advanced state of preparedness of the scientific and technological aspects of the project, we consider that there is a genuine need to combine the efforts of scientific and industrial organizations of various countries in order to bring about an early solution to this important problem.

We were pleased with the proposal of the International Centre for Scientific Culture and the Global Laboratory for the participation of Ukraine in the global environment monitoring project. Currently, working groups for the basic aspects of the project are being established. For the Ukraine, a zone of ecological disaster, this project is of great interest, as is everything related to mankind which has ventured into space so as to help the Earth.

Ukraine is taking its first independent steps along the difficult path to the stars but its frontiers are wide open to international cooperation along the way. We deeply believe in mankind's collective wisdom, in its future in space, and we are ready to work towards that end.

The CHAIRMAN: I now call on the representative of INTELSAT.

Mr. TRUJILLO (INTELSAT): On behalf of the International Telecommunications Satellite Organization, INTELSAT, I should like to express my appreciation for this opportunity to exchange views with my colleagues here today. I also wish to thank you for your leadership of this session of the Committee; I know your counsel and guidance will be of great benefit while the Committee conducts its work.

Since the last meeting of the full Committee, the INTELSAT global satellite system has continued to expand to meet the growing world-wide demand for telecommunications services. This year, the number of satellites providing

(Mr. Trujillo, INTELSAT)

service is the largest in INTELSAT's history: a fleet of 19 spacecraft.

INTELSAT successfully launched and deployed two of our largest, most powerful satellites - INTELSAT VI - during the past year. Last August, the INTELSAT 605 satellite was successfully launched from Kourou, French Guiana, by Arianespace. In October 1991, the last of the VI series, the INTELSAT 601, also was successfully launched by Arianespace. With these two successful launches, the first INTELSAT VI satellite was deployed to the Indian Ocean region, enabling the introduction of satellite-switched time-division multiple-access (SS/TDMA) service in the region.

With an in-orbit weight of nearly three tons, each INTELSAT VI has the greatest mass and complexity of any commercial communications satellite ever built. It is the world's heaviest commercial communications satellite.

Nearly four stories tall when deployed, INTELSAT is a spin-stabilized spacecraft. Using advanced digital-circuit multiplication equipment, each INTELSAT VI carries as many as 120,000 telephone calls and three color television channels. In contrast, Early Bird, the first INTELSAT satellite, launched 27 years ago, had capacity for only 240 two-way voice circuits and only one black-and-white television channel. Each INTELSAT VI has 38 C-band transponders and 10 Ku-band transponders.

In May, millions of people around the world witnessed one of the most dramatic and compelling feats of manned space flight ever accomplished. This adventure involved another INTELSAT VI satellite, the 603. The United States National Aeronautics and Space Administration's newest Space Shuttle, called Endeavour, embarked on a daring mission on its maiden voyage: the rescue and repair of the INTELSAT 603 satellite, which had been stranded in a low-earth orbit for more than two years after a failed launch attempt. As millions of viewers watched on television, Endeavour's astronauts engaged in repeated

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spacewalks during three attempts to capture the satellite, manoeuvred it to the shuttle bay following a successful capture, and attached a new rocket motor. These were the first NASA spacewalks since 1985 and a record number during a single mission.

The unique, extraordinary video images of the Endeavour crew's repeated attempts to capture the INTELSAT satellite also captured the world's attention. For a few days, the world watched as the brave crew executed a creative, and ultimately successful, effort to capture the satellite.

INTELSAT's Launch Control Center and worldwide tracking, telemetry and control network also played a pivotal role in the mission's success. One key achievement of the mission was the first dual rendezvous of two spacecraft - the satellite and the space shuttle - ever attempted in the history of mankind's exploration of space. The combined expertise of the joint INTELSAT, Hughes Aircraft Company and NASA team was critical to the mission's accomplishment.

Following attachment of the new motor, INTELSAT Mission Control fired the motor, sending INTELSAT 603 a fourth of the distance to the Moon in a supersynchronous transfer orbit. This unusual manoeuvre was chosen to conserve the satellite's fuel and enhance its lifetime. The spacecraft was then placed in geostationary orbit and its solar drum and communications antennas deployed.

(Mr. Trujillo, INTELSAT)

INTELSAT 603 will begin commercial service in the Atlantic Ocean region in time to join other INTELSAT spacecraft for transmission of the Summer Olympics from Barcelona. When fully operational in mid-July, this single powerful satellite will provide a full range of state-of-the-art telecommunication services to over 60 countries on four continents.

Another important addition to our INTELSAT fleet was accomplished last week, on 9 June, when the INTELSAT K satellite was successfully launched. The satellite was propelled into transfer orbit by a General Dynamics Atlas IIA launch vehicle after lift-off from Cape Canaveral Air Force Station in Florida. Designed to meet the needs of international broadcasters for the next 10 years, the high-powered INTELSAT K will link Europe and the Americas with 19 different transmission combinations, using ground antennas as small as 1.2 metres. This flexibility makes the INTELSAT K ideal for programme distribution and satellite news-gathering purposes. For instance, for the first time, a broadcaster in Europe will be able to reach markets in both North and South America using only one transponder. After deployment and in-orbit testing, the satellite will also begin operation in time to carry coverage of the Summer Olympic Games from Barcelona.

The INTELSAT K, which will be located at 338.5 degrees east longitude over the Atlantic Ocean, has 16 transponders that can be configured into 32 high-quality television channels. The satellite will offer uplink and downlink service from the eastern half of North America to as far east as Moscow, and downlinks to the major metropolitan areas of South America.

For the longer term, we anticipate the availability of the first of the next generation of INTELSAT satellites, INTELSAT VII/VII-A, next year. Seven of these satellites have been ordered. According to current plans, two INTELSAT VII satellites are marked for service in the Atlantic Ocean region in

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the 1993-1994 time frame, followed by two more in 1995. These spacecraft will provide high-powered coverage of Europe at both C- and Ku-bands. The power levels of the INTELSAT VII series have been designed to work with smaller Earth stations. Small user-premise Earth stations are the look of the future around the world, and INTELSAT is designing its system to meet the requirements of this trend. Each INTELSAT VII will have an average capacity of 18,000 simultaneous two-way telephone circuits plus three television channels. This means that each satellite has the potential capacity for up to 90,000 simultaneous two-way telephone circuits using digital circuit multiplication equipment. Steerable C-band spot beams will add new dimensions and flexibility for coverage.

Last December, INTELSAT issued a request for proposals for design of a follow-on satellite system. Bids were received from four major spacecraft manufacturers. A contract award for the new satellites could be made this September, at which time a decision will be taken on the mix of spacecraft to be ordered.

In conjunction with our continuing efforts to guarantee the availability of adequate space segment capacity, INTELSAT is also working to insure a diversity of reliable launch-vehicle suppliers. Recently, we signed a contract with a launch-vehicle supplier from the People's Republic of China. INTELSAT and China Great Wall Industry Corporation's contract, signed in April, calls for the first commercial launch of a Long March 2E/HO series rocket to carry either an INTELSAT VII-A satellite or our next series of INTELSAT spacecraft. The launch is scheduled tentatively between December 1995 and February 1996. This contract marks an important milestone both for the People's Republic of China and the INTELSAT organization. We look forward to the success of this partnership.

(Mr. Trujillo, INTELSAT)

In addition to satellite capacity, membership in INTELSAT also has continued to grow. Last July, the Union of Soviet Socialist Republics became the 121st member nation of INTELSAT. The Russian Federation has since informed INTELSAT that it has assumed the former USSR's role in the organization. In April 1992, the Republic of Azerbaijian became the 122nd member, and just a few weeks ago, in May, the Czech and Slovak Federal Republic joined the organization as its 123rd member nation. We are pleased to report these new memberships to the Committee today, and expect other countries in Eastern Europe and the Commonwealth of Independent States to join INTELSAT soon.

One of INTELSAT's distinguishing strengths is the commitment of our members and the close relationship we have with them as our customers. Closely related to this strength is how INTELSAT is managed. It is an international non-profit cooperative, yet it is run on a commercial basis. Decisions are taken based on sound business principles, not political pressures. Indeed, the majority of INTELSAT decisions are made on the basis of consensus. The success of our 28-year-old endeavour is the direct result of the willingness of our members sometimes to forgo individual preferences for the greater good. The 123 member nations of the INTELSAT consortium work together to meet their mutual communications needs. In a world where it is very easy for political, economic, social and cultural issues to divide nations, the fact that INTELSAT works so well is noteworthy in itself.

Beginning 28 years ago, the INTELSAT organization pioneered the peaceful use of outer space for the benefit of all nations. Our member nations, many of which are represented here today, are partners in a great enterprise: providing global telecommunications to all nations on a non-discriminatory

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basis. We successfully fulfil this mandate because of the cooperation and sense of comity shared by the member countries.

Last month's exciting events in space thrilled the world, and I am pleased to report to the Committee today that we believe the future of satellite telecommunications will be equally exciting. We are now engaged in planning the satellite system for the rest of this decade and beyond. This partnership of nations remains robust and firmly committed to maintaining the INTELSAT satellite system for the benefit of all nations.

The CHAIRMAN: I now call on the representative of the International Law Association (ILA).

Mr. BÖCKSTIEGEL (International Law Association (ILA)): As members may recall, at last year's session of the Committee on the Peaceful Uses of Outer Space in Graz, I gave some general information on the International Law Association (ILA) and on its Space Law Committee, which I have the honour to chair, whose Rapporteur is Professor Maureen Williams of Argentina, and whose members are distinguished specialists of the field, many of whom are well known to the members of the Committee and its Legal Subcommittee.

At the meeting of the Legal Subcommittee in Geneva in April, I reported that, as early as the ILA Conference in Paris in 1984, the Space Law Committee had concluded several years of work on a draft convention on the settlement of space law disputes. Developments since then seem to indicate that, with the growth of the number of States active in space and of the volume of commercial space activities both of States and of private enterprises, dispute settlement is becoming of more and more practical importance and may have to be taken up again by such bodies as the ILA or the International Institute of Space Law (IISL), or perhaps eventually by the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space. As a contribution and starting-point to

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such efforts, I had enclosed the text of the ILA draft convention to that statement. If participants in this meeting here would be interested in receiving the text of that draft convention, they can let me know and I shall be pleased to send it to them.

(Mr. Böckstiegel, ILA)

Secondly, let me refer to another draft convention, which deals with a different subject and was elaborated in a different context. As members may recall, the Legal Subcommittee, at its session in 1991, took note of the draft for a convention on manned space flight presented at that session by the International Astronautical Federation (IAF). Several delegations, at following meetings, expressed support for this draft, which was considered again a few weeks ago at an international experts' colloquium organized by our own Institute, in Cologne, from 19 to 22 May 1992. Since that draft convention is the result of several years' cooperation between the Academy of Sciences of the then USSR, the University of Mississippi in the United States of America and our Institute of Air and Space Law (IASL) in Germany, if any efforts on the subject are considered appropriate by this Committee or its Legal Subcommittee, I am sure that not only these national research institutions, but also the ILA would be prepared to be of assistance, together with the IISL, which submitted the draft convention through the IAF to the Legal Subcommittee.

Let me now turn to a third drafting project in space law: this concerns the field of debris and pollution arising from space activities, which has been raised more often in recent years than any other field by delegations as a possible next subject for the Committee's agenda and its Subcommittees; indeed, Mr. Chairman, you raised this subject again in your introductory remarks this morning.

At last year's meeting in Graz, I reported that at the ILA Conference in Seoul in 1986 the ILA had given a mandate to its Space Law Committee to elaborate principles and guidelines on debris and pollution arising from

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activities in outer space. The work on this subject then culminated in an international interdisciplinary symposium, which my own Institute, the Institute of Air and Space Law at the University of Cologne, organized, together with the ILA Space Law Committee and the IISL in Cologne, in 1988; in this, several prominent members of this Committee participated. The proceedings of this colloquium have been published in book form. The results were then examined at the 1988 ILA Conference in Warsaw, and the work of the Space Law Committee continued on that basis and culminated in a comprehensive report.

On that basis, the 1990 ILA Conference, in Australia, gave a mandate to the Space Law Committee to start work on drafting an international instrument on environmental aspects of space activities and space debris in particular. That work was taken up by members of the Space Law Committee, with the assistance of two of the top technical experts in their field, well known to members of the Committee, namely, Dr. Perek of Czechoslovakia and Professor Rex of Germany. An interim report, written by the Rapporteur of the Committee, Professor Williams of Argentina, was presented to the ILA Conference in Cairo in April 1992. That Conference passed a resolution continuing the Space Law Committee's mandate, with more specific guidelines.

Let me briefly cite the following, from the substantive part of the resolution, to give you an indication of its general tenor:

"The 65th Conference of the International Law Association, held in Cairo, Egypt, 21-26 April 1992:

"... Recommends that ... the [space law] Committee should deal with the following substantive matters:

(1) "The definitions of contamination, pollution and debris;

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(2) "The scope of application of the Instrument, which should be as wide as possible;

(3) "A general obligation to cooperate, incumbent on States and international organizations engaged in space activities, in order effectively to implement the Instrument;

(4) "In addition, more precise obligations, such as obligations to prevent, to inform, to consult, and to negotiate in good faith when there are reasons to believe that a certain space activity is likely to be detrimental to the environment;

(5) "The questions of responsibility and liability;

(6) "Methods of dispute settlement, including provision for compulsory third-party settlement of disputes should no agreement be reached within a specified time-limit;

"Requests the Secretary-General [of the ILA] to forward the Committee's report, containing the proposed draft instrument, to the United Nations Committee on the Peaceful Uses of Outer Space, for its consideration."

On that basis, the ILA will continue its work in the hope of presenting a full draft instrument to the 1994 ILA Conference in Buenos Aires; in this context, I noted with great interest that not only General Assembly resolution 45/72 of December 1990 but also your own introduction this morning, Mr. Chairman, and several statements made by delegations at this and the 1991 meeting of this Committee and at the meetings of the Technical and Legal Subcommittees in 1992 identified environmental aspects of space activities, and particularly space debris, as appropriate subjects for discussion in this Committee and its two Subcommittees. The International Law Association shares that view, and will, of course, be ready and happy to assist in any work done in this field.

(Mr. Bockstiegal, ILA)

The CHAIRMAN: I now call on the representative of the International Society of Photogrammetry and Remote Sensing.

Mr. KONECNY (International Society of Photogrammetry and Remote Sensing (ISPRS)): The ISPRS is very pleased to be attending this meeting and to have the opportunity to communicate with members here. ISPRS is a scientific society representing users' interests in Earth sensing, mapping and geographical information systems. It has 85 national members, comprising the national photogrammetry and remote sensing societies in 85 countries, plus five regional members, comprising the continental remote sensing associations of Europe, Asia, Latin America, Africa and Australia-Oceania.

The Society was founded in 1910, and at that time dealt only with aerial surveys; now, however, it includes space sensing to an increasing degree. The Society meets at quadriennial congresses, and the next venue will be Washington D.C., from 2 to 14 August 1994, just before the World Space Congress. About 3,000 delegates are expected. Between congresses, work is carried out in seven techical commissions and about 50 working groups addressing the aspects of sensing, instrumentation, modelling, mapping and interpretation of data.

(Mr. Konecny, ISPRS)

The responsibility for these commissions is distributed internationally. It is currently in the hands of Brazil, Germany, China, Japan, Switzerland, Greece and Canada.

Since 1976 the Society has taken an active role, reviewing progress and techniques for evaluating space data. It considers its observer status in this Committee to be very important. Since that time, ISPRS has established a working group on international cooperation in satellite Earth remote sensing. In 1986 it furthermore took the initiative of creating a coordination body for organizations holding remote-sensing conferences: the Joint Board of Remote Sensing Activities (JOBRESA). JOBRESA meets annually to exchange information and to coordinate meetings among such organizations as the International Astronautical Federation (IAF), ISPRS and the space agencies.

The concerns of ISPRS are those of the user in the following user disciplines.

Basic mapping constitutes about 30 per cent of the uses of non-meteorological satellite data. Owing to its traditions, the mapping community has considerable experience in assessing the effort to compile and maintain planning, environmental and resource data. On a world average, about 0.03 per cent of gross national product is spent on this task. That is about 0.3 per cent of current annual national budgets. Within the past 50 years world progress in basic mapping has been able to cover only 50 per cent of the Earth's surface at the medium scales required for the planning of

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sustained development. World-wide, the average age of these maps is over 40 years, and there is no hope that the remaining coverage will be acquired and kept up to date in developing countries except by satellite remote sensing.

Monitoring renewable resources such as forests and arable lands constitutes about 20 per cent of the current uses of satellite data. Non-renewable resource surveys amount to 18 per cent of satellite data uses. Environmental uses account for 16 per cent, and other planning uses account for another 16 per cent.

Despite the fact that by the year 2000 about 15 nations or bodies will operate about 50 different remote sensing satellite systems, current space efforts are insufficient to meet the needs. The International Space Year (ISY) has focused attention on the theme "Mission to Planet Earth", following the initiative of space agencies around the globe. From the user's viewpoint, however, the following bottlenecks are still to be overcome. There is no need to be overly critical considering the spectacular progress already made, but the identification of critical issues is nevertheless useful for progress, and we want to raise this point now.

First, the space agencies have made significant contributions in providing fast-access low-resolution satellite data for the purposes of meteorology and climate studies. Those images have even been useful in providing assistance to vegetation and environmental monitoring on a global scale. These programmes have been highly successful despite their low resolution, because they have provided adequate data-reduction facilities on an international and local level. This applies also to special science missions to small groups of scientists.

(Mr. Konecny, ISPRS)

Space agencies have likewise made significant progress through the programmes of LANDSAT, SPOT, MOS, IRS, ERS-1 and imagery from COSMOS satellites and the Mir space station to provide medium-scale regional and local information for large user communities.

However, most if not all of these efforts have been top-down approaches. The main drive has been to compete internationally in technology. The technological drive has come either from the space agencies themselves or from space industries working for those agencies. There has been formal user involvement, through committees and research grants, but not many user wishes have been taken seriously to modify space efforts from the bottom up.

In the cold-war period, military restrictions were imposed on the resolution of sensing, and even if these now appear to be disappearing there are now other restrictions imposed by the expenses involved in providing higher spatial resolution, by higher transmission rates and greater swath-width, and by providing adequate data-processing facilities. Why is it that we still do not have a 5-metre-pixel operational system in stereo, which is vital for recognizing transportation networks, settlement areas and hydrological features? Only in that case would user agencies commit their own funding for solving their problems with satellite data. So far they are hesitant to do so if they have funds for alternate, higher-quality data acquisition procedures.

Why is it that most users are still not able to obtain timely image data from systems already in orbit? The reasons are obvious. Restrictions in funding allocations have preventing the building and operation of the required

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sensors, and a lack of funding has thus far particularly severely limited processing capabilities.

Secondly, one of the severe restrictions imposed on satellite remote sensing has been the commercialization of remote-sensing satellites imposed by the United States Land Remote Sensing Commercialization Act, distinguishing between non-commercial low-resolution satellites and those of higher-resolution for which the user should pay in part. LANDSAT licensing fees and product prices have markedly influenced prices of the SPOT programme and even those of Soviet imagery and ERS-1. It is in the developing countries that the need for these images is greatest, and even if a LANDSAT thematic mapper tape costs only $8,000 - or 23 cents per square kilometre - and a SPOT tape $2,500 - or about 70 cents per square kilometre - those countries can ill afford purchases of systematic coverage of the imagery unless that imagery is acquired as a part of project activities.

Then it should be realized that projects in remote sensing are not decided upon on the basis of satellite data availability. Costs for such projects are scale- and resolution-dependent. A global biomass study carried out through meteorological data at the scale of 1:1 million only costs about $2 per square kilometre. Forest mapping at 1:250,000 already costs $6 per square kilometre. And resource and environmental studies at a scale of 1:100,000 require expenditures of $20 per square kilometre. At a scale of 1:50,000, which most people need for their resource management, the costs rise to $150 per square kilometre, while for purposes of land reform 1:10,000 aerial surveys at $400 per square kilometre and for urban development 1:5,000 aerial surveys at $1,200 per square kilometre are required.

(Mr. Konecny, ISPRS)

The market for remote-sensing products therefore remains uncertain unless Governments have the possibility to budget for their bottom-up needs. Everyone who visits India is impressed with how the Indian Space Research Organization (ISRO) has taken user needs into account. India's interdepartmental and regional activities can serve as a model of how a bottom-up approach can work.

Thirdly, with regard to different sensors, there could be a competition among sensing systems if their data could be made available properly in a value-added form, that is geo-coded and merged with map data not obtainable by remote sensing, in which boundaries, place names and other information collected on the ground are contained. In this respect, space remote sensing becomes a key element in feeding up-to-date information into geographic information systems. In merging this type of information on a raster basis, and map data on a vector basis, it is virtually irrelevant which type of sensor data are utilized. LANDSAT TM is the sensor best for spectral resolution; SPOT offers the only true space stereo capability, with a base-height ratio of up to 1, to provide digital terrain models of the earth.

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However, such images are not always available, and arrangements should be made to have more.

Russian space photography with KFA-1000 offers the highest spatial resolution from space, and at distinctly the lowest possible cost.

Why is it that only second-generation copies, with deteriorated resolution, are sold, if the original film could be scanned at at least 10 micrometre intervals and marketed in digital form with 3 to 5 metre pixels? It is such issues that the ISPRS discusses at its meetings. We have a number of publications on these issues, and more will be forthcoming at the August 1992 Washington Congress. Our efforts are not to confront the highly successful achievements of the space agencies, but to provide a user input to them which can eventually enhance and optimize space remote-sensing capabilities, which is our mutual concern.

We believe that this Committee is the best forum in which such issues can be discussed and resolved, and we are grateful for the opportunity to present our views.

The meeting rose at 1 p.m.